

Lesson Plan

Title: Name the Energy Source Game Programming

Overview:

At the end of the 20th century, the demand of energy on earth has increased rapidly. Scientists predict that if we do not look for alternative energy sources and change our life style, the fossil fuels that human depends on producing energy today will be depleted in near future. It is important that students understand how energy is being created today, what resources we use today and what will be the alternatives in the future. With these understanding, students will be equipped to help designing new energy alternatives and start to adapting new life style.

For this lesson students will learn to design a Scratch program to help players learn about the different energy sources. With the advancement of technology and dependency on computing and digital devices, all students should learn basic programming in order to provide future workforces required to maintain the infrastructure systems that support our society.

Subject: Digital Literacy and Environmental Science

Objectives:

- Students research and learn about the major characteristics of different renewable and non-renewable energy sources
- Students learn to design and program a simple game using Scratch
- Students learn to collaborate ideas and group programming

Grade: 6 to 8

Classroom setting: Computer Lab, each student has access to computer

Session Required: 3 to 6 sessions, depending on student programming skills

Session Duration: 50 minutes

Performance Standards:

- Environmental Science
- Digital Literacy

Professional Development Competency:

- Competency 3c – Engaging students in Learning

Student Skill Prerequisites:

- Basic programming using Scratch
- Internet research
- Students know how to log on to their Blendspaces account and create a shared lesson/discussion with other students

Teacher Preparation:

- Create a BlendSpaces lesson with selected web sites (3 to 4) related to energy resources. Students will pick an energy source to research by visiting these web sites. If there is not enough time for students to do research, make a copy of the article “Energy of Sources of the World!” or other articles for students.
- Prepare a scavenger question and task list about energy resources for students
 - Is the energy renewable or non-renewable?
 - Does the energy create air pollution or land pollution during its production?
 - Does the energy affect the wildlife or natural setting during its production?
 - Is it cost effective to produce this energy?
 - List 5 major characteristics of the energy source, including using the answers from questions above. Example: it is hot, it works only when there is wind, it is a gas, the resource used to produce this energy is solid
 - Which icon/picture you will use to represent this energy? You can choose one from Internet or create one yourself later within Scratch. (Teacher may need to help students for this step if students do not have the skill. Teacher needs to tell student which graphic format to use for the picture.)
- Prepare a game design document template to help students creating their game design document

Procedures:

Gathering Energy Sources Information

1. Lesson overview with students (5 minutes)
2. Students will work in a group of two. (To save team grouping time, use number matching or number counting to group teams, encourage students to partners they have not been work with) (5 minutes)
3. Assign energy source that each group of students will research about by providing a list of energy for students to pick. Make sure each energy source is assigned for at least one group.
4. Students will log on to their Blendspaces account, and select the Blendsapces lesson for Name the Energy, read instruction and questions from lesson. (5 minutes)
5. One student will create a Blendspaces lesson and invite their partners (5 minutes)
6. Students start visiting the assigned web sites and answer the questions by typing to the shared Blendspace lesson. Students can discuss about the answers for each question and draft for the final version as a team. (15 minutes)

Designing the Scratch Game

1. Using the group answers, students will design and program a SIMPLE computer game using Scratch to help others to learn about the energy.
2. Game Objective: player will try to guest the correct energy source with minimum hints.

3. Student Groups will create a game design document by following the steps from <http://www.stemchallenge.org/students/game-design-documents>
 - a. The game design document must include information such as:
 - i. Game Objective: players will use the hints to help them identify the energy source, the less hints used will earn higher score. Player with higher scores will win
 - ii. **Number of players: 1 (limited to 1 player for this lesson)**
 - iii. Game Objects: energy name, energy picture, five energy characteristics/hints, hint counter, answer box, and etc.
 - iv. Game Stage: display Title (What is the energy?), and arrange the sprites (Hint 1, Hint 2, Hint 3, Hint 4, Hint 5, hint counter, answer box) appropriately
 - v. Game mechanics

Creating the Scratch Game for Individual Energy Source

1. Students must submit their game design
2. Students will log on to their online scratch account (<http://scratch.mit.edu>)
3. Students work in the same groups to create the game. The students in the group may create individual program or create just one program for the group. Regardless their decision, the students in the group must support each other in the creation of the game.
4. When the group has completed and tested their program, the group must demonstrate to the teacher to get approval to combine their program with another group working on a different energy source.
5. Each group of students will continue combining their programs with others until the final program consists of all different energy sources.
6. Each group of students will publish the final program on the scratch web site (<http://scratch.mit.edu>)
7. Students will test play other groups' programs and comment and share.
8. Students will post the link to their game on the portfolio website
9. Students will advertise their games to their friends, classmates and family

Lesson Extension:

Students who complete their games early should continue to improve their program in performance and look. Advanced students may work on to create a new version of the program for multiple players.

Student Assessment:

- Use of BlendSpaces.com for team collaboration
 - Competency: can create new shared lesson/discussion and share with others
 - Need Improvement: need help in creating shared lesson/discussion and editing
- Program Design
 - Competency: the game design document is complete with all essential components for program design
 - Need Improvement: the game design document is incomplete, missing major components
- Programming Skill
 - Competency: the energy game performs as it is designed according to the game design document, the game objective is met, the game is user-friendly and engaging.

- Need Improvement: program is not working correctly according to the game design document.
The game is difficult to navigate and/or has poor user interface or instructions.